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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/622,330	07/17/2003	Ioannis Kokolakis	2572P	4830
7590 12/08/2004				
SAWYER LAW GROUP LLP P.O. Box 51418 Palo Alto, CA 94303			EXAMINER CHANG, JOSEPH	
			ART UNIT 2817	PAPER NUMBER

DATE MAILED: 12/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/622,330

Applicant(s)

KOKOLAKIS, IOANNIS

Examiner

Joseph Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7, 14-16, 19-21, 23, 24 and 27-31 is/are rejected.
- 7) ☒ Claim(s) 4-6, 8-13, 17, 18, 22, 25, 26, 32 and 33 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/17/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: CURRENT STEERING CHARGE PUMP
HAVING THREE PARALLEL CURRENT PATHS PREVENTING THE CURRENT
SOURCES AND SINKS TO TURN OFF AND ON.

Claim Objections

Claim 15 is objected to because of the following informalities: "output mode" in Line 3 has a typographical error and it should be --output node--. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 14-16, 19-21, 23, 24, and 27-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Shenoy et al. US Pat. No. 6169458.

Regarding Claim 1, Shenoy et al. discloses a charge pump (210) for receiving control signals (UP and DOWN signal from 208, see Fig 1), the charge pump sourcing

and sinking current in response to the control signals (intrinsic functionality), the charge pump comprising:

- a main current source (252);

- a secondary current source (254);

- a main current sink (256);

- a secondary current sink (258);

three current paths (see figures 3-5 for three different states: charge, discharge and high-impedance) provided between the current sources (252, 254) and the current sinks (256, 258),

wherein a first current path (State of Fig. 5: path of 282, 264, 260 and 286) and an output node (net 10) is provided between the main current source (252) and the main current sink (256),

a second current path (State of Fig 4: path of 282, 264, 280, 272, and 288) is provided between the main current source (252) and the secondary current sink (258), and

a third current path (State of Fig 3: path of 284, 268, 280, 260, and 286), is provided between the secondary current source (254) and the main current sink (256).

Regarding Claim 2, Switch 268 for the first current path; switch 264 for the second and the third current paths. The current paths are parallel because they are independent.

Regarding Claim 3, the figure 3-5 shows each of the three current paths includes an upper switch (270, 268, 264, 266) connected in series with a lower switch

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(274, 272, 260, 262), wherein the common node (net 10) of the switches of the first current path defines the output node.

Regarding Claim 28, as noted above in Claim 1 rejection, Shenoy et al. discloses a charge pump (210), which would necessarily perform the method claimed.

The following rejection is based on a different view of the three current paths discussed above.

Regarding Claim 1, Shenoy et al. discloses a charge pump (210) for receiving control signals (UP and DOWN signal from 208, see Fig 1), the charge pump sourcing and sinking current in response to the control signals (intrinsic functionality), the charge pump comprising:

- a main current source (252);

- a secondary current source (254);

- a main current sink (256);

- a secondary current sink (258);

three current paths (within one given state, e.g., charge state in fig.3, the main charge current path flows from 254, then 284, 268, 280, 260, 286, and 256, the second path flows from 252, then 282, 266 and 290; the third path flows from 292, then 274, 288, and 258) provided between the current sources (252, 254) and the current sinks (256, 258),

wherein a first current path (the main charge current path) and an output node (net 10) is provided between the main current source (252) and the main current sink

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(256), (it is noted that the phrase “provided between” is broad term that any path between two current sources reads the phrase “provided between”).)

a second current path (the second path flows from 252, then 282, 266 and 290) is provided between the main current source (252) and the secondary current sink (258), and

a third current path (the third path flows from 292, then 274, 288, and 258), is provided between the secondary current source (254) and the main current sink (256).

Regarding Claim 2, Switch 268 is for the first current path; Switch 266 is for the second and Switch 274 is for the third current path. The current paths are parallel because they are independent and separate paths.

Regarding Claims 28-31, as noted above in Claims 1-2 rejection, Shenoy et al. discloses a charge pump (210), which would necessarily perform the method claimed.

Regarding Claim 14, Shenoy et al. discloses a charge pump (210c in fig. 3) for receiving control signals (Up and Down), the charge pump sourcing and sinking current in response to the control signals (intrinsic functionality), the charge pump comprising:

a current source (252);

a current sink (256);

at least three current paths (within one given state, e.g., charge state in fig.3, the main charge current path flows from 254, then 284, 268, 280, 260, 286, and 256, the second path flows from 252, then 282, 266 and 290; the third path flows from 292, then 274, 288, and 258) provided between the current source (252) and the current sink

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(256), wherein each of the current paths includes at least one switch (268 for the main, 266 for the second, and 274 for the third current path), wherein an output node (Net 4) is defined on one of the current paths (main path) and central nodes (290 and 292) are defined on the other current paths (the second and the third); and

a plurality of buffers (276, 278) operative to maintain the node voltages of the central nodes at the same voltage as the output node (intrinsic property of the buffer of gain of one), wherein each buffer is coupled between two of the three current paths (buffer is in between the main path and other paths, see Figure 3).

Regarding Claim 15, Figure 3 shows a plurality of buffers (276, 278) each have an input node (Net 10, Net 4) coupled to the output node (Net 4), and wherein one buffer (276) has an output node (Net 14) coupled to a first one (290) of the central nodes (290, 292), and a different buffer (278) has an output node coupled to a second one (292) of the central nodes (290, 292).

Regarding Claim 16, Figure 3 shows secondary current source (254) and sink (258) and three current paths (within one given state, e.g., charge state in fig.3, the main charge current path flows from 254, then 284, 268, 280, 260, 286, and 256, the second path flows from 252, then 282, 266 and 290; the third path flows from 292, then 274, 288, and 258) provided between the current sources (252, 254) and the current sinks (256, 258),

wherein a first current path (the main charge current path) and an output node (net 10) is provided between the main current source (252) and the main current sink

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(256), (it is noted that the phrase "provided between" is broad term that any path between two current sources reads the phrase "provided between".)

a second current path (the second path flows from 252, then 282, 266 and 290) is provided between the main current source (252) and the secondary current sink (258), and

a third current path (the third path flows from 292, then 274, 288, and 258), is provided between the secondary current source (254) and the main current sink (256).

Regarding Claims 19-21, 23-24 and 27, as noted above in Claim 14-16 rejection, Shenoy et al. discloses a charge pump (210c in fig. 3), which would necessarily perform the method claimed. Further the figure shows UP, UP inverse, DN, and DN inverse input control signals (300, 302, 304, 306).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shenoy et al. in view of Wakayama US 6326852.

As noted in claims 1-3 rejections, Shenoy et al. discloses a charge pump having upper and lower switches. However, Shenoy et al. do not explicitly disclose that the switches are P-channel or N-channel transistors.

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As would have been well known in the art, P and N channel MOSFET transistors are used for switches, as shown in Wakayama, as an example.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time of invention to use P and N channel MOSFET transistors in the upper and lower switches as taught by Wakayama in place of the generic switches because such modification would have been considered a mere substitution of art-recognized equivalent P and N channel MOSFET transistors.

Allowable Subject Matter

Claims 4-6, 8-13, 17, 18, 22, 25, 26, 32 and 33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the best prior art of record, Shenoy et al., taken alone or in combination of other references, does not teach or fairly suggest the switches of the second and third current paths define two central nodes (Claims 4-6), or a replica current source (Claims 8-13, 25, 26, 33), the current paths includes an upper switch connected in series with a lower switch (Claim 17-18, 22, 32).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Girard et al. discloses a charge pump providing equal source and sink currents.

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Hughes discloses a charge pump having a charge balance compensation circuit.

Parker et al. disclose a charge pump having replica circuit.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Chang whose telephone number is 571 272-1759. The examiner can normally be reached on Mon-Fri 0700-1730.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal can be reached on (571) 272-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Joseph Chang
Patent Examiner
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